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From: ED FALLON
BROOKFIELD

9 PAGES

AIR QUALITY REPORT

SUMMARY

ONE LIBERTY PLAZA

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October 22, 2001

Project No.: Y13390
N3-7466

2.0 INTRODUCTION

2.1 General Discussion

Brookfield Financial Properties (Brookfield) has retained Hillmann Environmental Group LLC (Hillmann) to perform an Environmental Health Risk Assessment at One Liberty Plaza. Hillmann was also employed by Brookfield to perform environmental sampling and consulting throughout the restoration process since September 11th 2001.

The purpose of this Environmental Health Risk Assessment is to determine if there is an elevated risk to human health in the building relating to environmental factors caused by the explosions and collapse of the World Trade Center.

On the morning of September 11th 2001, The World Trade Center (WTC) was subject to a terrorist attack. This attack resulted in a tragic loss of lives, the collapse of both 110-story towers, the collapse of 7 WTC, the collapse of the Marriott World Trade Center Hotel, and catastrophic damage to the other WTC buildings. The collapse caused tremendous physical forces to be exerted on the materials within the structures themselves and to the surrounding buildings. Many of the construction materials and interior finishes within the towers were ground to a fine dust by the force of the collapse. The displacement of material and air during the collapse caused what has been described as a "hurricane like" wind within a two-block radius of the collapse. This debris laden wind caused damage to the exterior sides of buildings facing the WTC and the interior offices adjacent to broken windows. Some of the buildings directly adjacent to the WTC received structural damage from falling steel and debris. One Liberty Plaza was not hit by steel or heavy pieces of debris and was not structurally damaged.

The primary environmental concern from this damage (non-structural) is from the dust created by the collapse and the smoke from the burning of debris. The dust contains cement constituents in the greatest percentage, followed by fibrous glass, gypsum, cellulose and other material. The steel structure of the lower 40 floors of the North tower was sprayed with fireproofing containing approximately 40% asbestos. Most of that material had been abated from the accessible interior steel over the years; however, asbestos remained on the exterior steel, under the aluminum skin of the building. Testing by Hillmann and others found some of the dust and debris adjacent to the North tower to contain greater than 1% asbestos and the dust to the South of the North tower (where One Liberty Plaza is located) to contain less than 1% asbestos.

2.2 Building Reaction and Damage to One Liberty Plaza

The building staff reacted in a timely manner to protect both human life and the integrity of the building systems. When the second plane struck the South tower of the WTC, the building engineers performed a manual shut down of the HVAC system including the closing of outside air intake dampers. This action resulted in the

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isolation of the building air handlers and HVAC systems. The elevators were returned to the ground floor and locked out and the building was evacuated. These actions were completed prior to the collapse of either tower.

The forces from the collapse of the South tower damaged 650 windows on the West side at One Liberty Plaza. The number of damaged windows was greatest in the lower half of the building with damage diminishing on the higher floors. The top third of the building had no broken windows. Dust and papers from the WTC came through the windows that had been broken. This accumulation of dust and papers was greatest below the 20th floor and was confined to the immediate area at the West perimeter of the building. Walls and doors limited the spread of heavy dust and papers. A light layer of fine dust covered other areas to the eastern side of the floors with broken windows. Again, the spread of this fine layer of dust towards the eastern side of the building was controlled by how each floor was designed. On open floors it spread further and, on floors with more walls and doors it did not spread as far.

Shortly after the collapse, the building was secured by the New York City Office of Emergency Management and used as a staging area for emergency response actions. Brookfield was allowed full access to the building starting on Sunday, September 16th 2001.

2.3 Cleanup Activities

Hillmann was contacted by Brookfield on September 13th 2001, and met with the Brookfield staff on September 14th 2001. Hillmann was hired to prepare health and safety plans, test for environmental issues, and coordinate environmental clean-up responses in the building.

Hillmann accessed the building on September 16th 2001, and proceeded in testing the debris and dust for asbestos content. Twelve samples taken on the first day indicated results of less than 1% asbestos. 75 samples taken subsequent to that time indicated less than 1% asbestos or no asbestos content. No samples of dust or debris in the building indicated levels of asbestos in the dust of greater than 1%. The New York City DEP issued a directive on September 14th 2001, for the clean-up of asbestos containing materials (ACM) which stated, "ACM is material which contains greater than 1% asbestos" and listed required abatement methodologies. Brookfield opted to clean the heavily dusted areas on the West side of the building using abatement methodologies and licensed asbestos abatement contractors as a safety precaution. On September 16th 2001, Hillmann's principal Health and Safety Officer performed a floor by floor, area by area inspection of the entire structures. Hillmann delineated areas with heavy debris and coordinated efforts with two qualified local firms to perform the dust abatement in these areas. ETS Contracting and PAL Environmental Contracting arrived on site on September 17th 2001, and began cordoning off the heavily dusted areas. These areas were then cleaned using asbestos abatement methodologies including the use of HEPA vacuums, wet methods, air scrubbers and engineering controls. The clean areas and lightly dusted areas were cleaned by

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conventional custodial means. The cleanup of heavily dusted areas took approximately three weeks. The custodial cleanup started about one week after the "asbestos type" cleanup and took approximately three weeks. Areas, which had undergone the environmental cleaning, were then re-cleaned by typical custodial methods.

Fan rooms, air intakes, mechanical rooms, elevator shafts, etc., were subjected to a cleaning process using the environmental contractors. The fan units were fully cleaned and the filters were replaced. The HVAC system became operational on October 15th 2001.

The building has drained, cleaned and flushed its water system and has also treated the water with chlorine.

2.4 Environmental Testing During Building Rehabilitation

Hillmann commenced environmental testing on the September 16th 2001. Daily air monitoring was conducted throughout the building. This sampling included parameters such as carbon dioxide, carbon monoxide, respirable dust, combustible gas levels, hydrogen sulfide, oxygen and volatile organic compounds measured by Photo Ionization Detection. Samples were also collected and analyzed for airborne silica dust and metals, sulfuric acid gases, volatile organic compounds by sample analysis and surface wipe samples for Poly Chlorinated Biphenyls, Poly Nuclear Aromatics and Priority Pollutant Metals. Hillmann has also performed extensive daily asbestos air monitoring throughout the building. Some asbestos air samples taken during the initial cleanup phase (before the windows were sealed) indicated levels above 0.01 fibers per cc. Other parameters measured in the building were at acceptable levels, except for occasional elevated carbon monoxide levels due to the use of generators operating outside of the building. Since the building has restored its power, the use of generators has ceased and the levels have returned to normal. Some volatile organic compound levels measured by Photo Ionization Detection (direct read equipment) were notable, but samples collected in these locations and sent for laboratory analysis did not reveal elevated levels for any specific volatile organic compounds. Some wipe samples for metals contained detectable concentrations of zinc and some lead. However, none of the airborne metals samples collected contained elevated metals, just trace amounts of copper and zinc. Cleaning methods being employed will eliminate these metal dusts.

There was no visible water damage or structural damage, except for minor water leaks in some of the upper floors and water intrusion in the sublevel walkway access tunnel to the World Trade Center. These water releases have been repaired and cleaned. The water intrusion in the sublevel appears to be run-off from fire hose water and does not appear to pose a current health risk. Odors emanating from the adjacent properties have been noted within the structure, especially when the wind blows in the direction of One Liberty Plaza. The air quality was tested frequently during these events and they did not affect air quality readings. The odors have

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subsidized since the building HVAC became operational, the windows were replaced and the burning of debris has decreased.

As Brookfield's cleaning activities were completed on each floor over the last three weeks, the 54 floors were tested for airborne asbestos. Five samples were run on each floor and analyzed using Phase Contrast Microscopy (PCM), NIOSH method 7400. As a quality assurance measure, one sample from each floor was analyzed by Transmission Electron Microscopy, EPA level II protocol, to assure the accuracy of the PCM analysis. Results of these samples were lower than the New York City standard for occupancy of abated areas (less than 0.01 fibers per cc).

2.5 Environmental Health Risk Assessment

When the building HVAC system was made fully operational and was activated, we began the Environmental Health Risk Assessment for the occupancy of the building. This testing was performed under normal occupancy conditions and represents the environment that the tenant may expect to encounter upon returning to One Liberty Plaza.

As part of Hillmann's health risk assessment, visual inspections were conducted on each floor throughout the building. This included identifying noticeable odors, unusual staining and/or discoloration of building materials or furniture, water damage/intrusion and dusty/discolored vents. In addition, mechanical equipment rooms (MERs) were inspected to assess the cleanliness of the HVAC machinery, the quality of the building's potable water system and chemicals stored on site.

In addition to the air and bulk sampling collected during the building restoration process, Hillmann conducted air clearance sampling for each floor to determine if the space can be determined as "occupy able". Sampling occurred when the HVAC system was fully operational. Three locations on each floor were monitored for temperature, relative humidity, carbon dioxide, carbon monoxide and respirable dust. Two total volatile organic compounds (TVOC), one microbial spore trap, one silica dust and one metal fumes in air samples were also collected per floor. On October 16, 2001, two TVOC, one microbial spore trap, one silica dust and one metals fumes in air samples were collected on Floors 37 thru 54. On October 17, 2001, two TVOC, one microbial spore trap, one silica dust and one metals fumes in air samples were collected on Floors 14 thru 36. On October 18, 2001, two TVOC, one microbial spore trap, one silica dust and one metals fumes in air samples were collected on the Sub-Concourse Level thru Floor 13. On October 19, 2001, temperature, relative humidity, carbon dioxide, carbon monoxide and respirable dust samples were collected on all floors throughout the building. Asbestos in air samples were collected in five locations per floor as part of the final clearance sampling. Air sampling results are summarized below in Table 2.6.

Two samples were found to contain greater than 1.7 mg/M³. Both are likely to have been caused by the presence of cleaning products (polishing sprays, carpet cleaners,

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etc.) and the painting of several surfaces. In addition, floor 6 has not been monitored for volatile organics due to active work being done at the time of sampling. Data provided is direct reading instrumentation. Additional samples will be collected on October 22, 2001 to confirm return to normal background levels of the elevated area and the 6th floor.

Comprehensive water sampling was conducted throughout building locations as part of the clearance sampling. This sampling was conducted on October 19, 2001. Samples were collected for Priority Pollutant Metals, Legionella Bacteria, Total Coliform Bacteria, Volatile Organic Compounds and random sampling for Cyanide, Nitrate, Nitrite, Sulfate and pH. Samples were collected from the house tanks, hot water heaters, supply water main, and random water source locations throughout the building, such as bathroom and pantry sinks. Water sampling results are summarized below in Table 2.7.

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Table 2.6. Summary of Analytical Airborne Findings

PARAMETER	Units of Measurement	Common Range	Measured Value	Acceptable Criteria
Temperature	Degrees Fahrenheit (°F)	60-90	67-78	66-76
Relative Humidity	Percent (%)	0-100	28-54	30-60
Carbon Dioxide	Parts per million (ppm)	300-7000	582-1186	700 + background
Carbon Monoxide	Parts per million (ppm)	0-20	0-2	10
Respirable Dust	Milligrams per cubic meter (mg/M ³)	0-2.0	0.42-1.48	3.0
Asbestos in Air	Fiber per cubic centimeter (f/cc)	<0.002 - 1.0	--	<0.01
Total Volatile Organic Compounds	Milligrams per cubic meter (mg/M ³)	0-15	0-7.07*	1.7
Metals Fumes In Air	Milligrams per cubic meter (mg/M ³)	0-1	0-0.013	5.0
Silica Dust	Milligrams per cubic meter (mg/M ³)	0-1	0-0.96	3.0
Microbial Spore Concentrations	Fungal Structure per cubic meter	0-250,000	0-3165	Depends on Species

*Two samples were found to contain greater than 1.7 mg/M³. Both are likely to have been caused by the presence of cleaning products (polishing sprays, carpet cleaners, etc.) and the painting of several surfaces. Additional samples will be collected on October 22, 2001 to confirm return to normal background levels.

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Table 2.7. Summary of Analytical Water Findings

PARAMETER	Units of Measurement	Consent Range*	Measured Range	Acceptable Criteria
Antimony	Milligrams per liter (mg/L)	Depends on Source		0.06
Arsenic	Milligrams per liter (mg/L)	Depends on Source		0.05
Barium	Milligrams per liter (mg/L)	Depends on Source		2.0
Beryllium	Milligrams per liter (mg/L)	Depends on Source		0.004
Cadmium	Milligrams per liter (mg/L)	Depends on Source		0.005
Chromium	Milligrams per liter (mg/L)	Depends on Source		0.1
Copper	Milligrams per liter (mg/L)	Depends on Source		1.3
Chromium	Milligrams per liter (mg/L)	Depends on Source		0.1
Cyanide	Milligrams per liter (mg/L)	Depends on Source		0.2
Lead	Milligrams per liter (mg/L)	Depends on Source		0.015
Manganese	Milligrams per liter (mg/L)	Depends on Source		0.05
Mercury	Milligrams per liter (mg/L)	Depends on Source		0.002
Nickel	Milligrams per liter (mg/L)	Depends on Source		10.0
Nitrate	Milligrams per liter (mg/L)	Depends on Source		10.0
Nitrite	Milligrams per liter (mg/L)	Depends on Source		1.0
Selenium	Milligrams per liter (mg/L)	Depends on Source		0.5
Sulfate	Milligrams per liter (mg/L)	Depends on Source		250
Thallium	Milligrams per liter (mg/L)	Depends on Source		0.0005
Zinc	Milligrams per liter (mg/L)	Depends on Source		5.0
Volatile Organic Compounds	Milligrams per liter (mg/L)	Depends on Source		Depends on analyte
pH	N/A	Depends on Source		6.5-8.5
Total Coliform Bacteria	Milligrams per liter (mg/L)	Depends on Source		Absence
Legionella Bacteria	Colony Forming Units per milliliter (CFU/mL)	Depends on Source		< 10 CFU/mL

*The anticipated range depends on the source of the water (well or surface), the treatments performed on the water, and whether it is a private or municipal distribution system.

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3.0 CONCLUSION

Based on the above information and the corresponding laboratory data, Hillmann Environmental Group, LLC has identified no contaminants that can reasonably be anticipated to create an increased risk of adverse health effects to building occupants. Therefore, we find One Liberty Plaza to be fully occupiable to the general public without restriction.

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